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THE CENTENARY OF ETHER

THE one hundredth anniversary of the use of ether at a surgical operation was commemorated in London in several ways. At the Royal Society of Medicine the Historical Section devoted a meeting to the subject. The President of the Section, Dr. Charles Singer, discoursed learnedly of the efforts at narcosis from the earliest times, tracing progress through the ages up to the present day. Miss Barbara Duncan outlined the history of anæsthesia by inhalation, and Dr. Joseph Blomfield described modern development of anæsthetic practice up to 1935. After the meeting the company were taken by motor charabanc and the courtesy of Dr. Arthur Underwood, the Director, to the Wellcome Institute of Research. There, after a sumptuous tea, they were enabled to inspect an exhibition got together by Dr. Underwood demonstrating the progress and development of anæsthetic drugs, apparatus and practice from the far past up to to-day.

At University College Hospital on a subsequent day Dr. Massey Dawkins, Anæsthetist to the Hospital, read a comprehensive paper which showed amongst other things the pioneering work which the institution had played in anæsthetic practice from the time of John Snow through the days of Dudley Buxton and Felix Rood. As an exhibit there was to be seen the small wooden operating table on which had lain the patient while Liston performed on him the first operation to be done in London under the influence of ether. Dr. E. A. Barton, whose father had been present when Liston operated, recalled the parental account of the screams and cries which accompanied a surgical operation before the days of anæsthesia.

TREATMENT OF HIRSCHPRUNG'S DISEASE BY SPLANCHNIC BLOCK

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HIRSCHPRUNG'S Disease or Megalocolon is a condition characterized by symptoms and physical signs which follow a fairly constant pattern, but whose ætiology is still not wholly proven, and whose treatment is far from satisfactory.

The disease, usually seen in infants and children, may appear in adults, presenting a similar clinical picture, though usually of a milder degree. Boys are more often affected than girls. Briefly the typical history is that of a male child suffering from obstinate constipation, with periodic attacks of diarrhœa. Vomiting may occur, growth is stunted, and the child is of sallow complexion. The abdomen is grossly distended. Diagnosis is confirmed by a Barium enema, or a Barium meal with a follow-through.

Pathology

The dilatation and hypertrophy are confined usually to sigmoid and descending colour; there is no organic obstruction distal to the affected gut, the gut below the recto-sigmoid junction being normal in calibre. The hypertrophy results from an increase in the circular muscle fibres, this at first being the chief change; later ulceration of the mucosa from stagnant fæces leads to infection and secondary fibrosis. It is obvious that any treatment likely to lead to normal bowel calibre must be performed before secondary changes take place, i.e., in the very young.

Aetiology

Most authorities regard the cause of megalocolon as being

due to neuromuscular incoordination, an imbalance between the sympathetic and parasympathetic taking place, leading to overaction of the sympathetic.

That this theory is probably correct is suggested by the results of various sympathectomy procedures and by the occasional association with other conditions, such as megalo-ureter, whose ætiology is regarded as having a similar basis.

Treatment

In the earliest stages this is essentially medical, liquid paraffin and regular daily enemata, distressing both to mother and child, being its chief features. Also various drugs, both parasympathetic stimulants and paralysants, have had their sponsors.

Surgical Treatment

Excision of the affected bowel was widely practised prior to any form of operation on the sympathetic system. This procedure is still performed but must inevitably carry a very high mortality.

Sympathectomy

Various procedures have been put forward, each with its own peculiar disadvantages. Left lumbar ramisectomy, lumbar II to lumbar V, was first advocated, and this was subsequently widened into lumbar ganglionectomy, with resulting loss of sympathetic control to the vessels of the lower limb.

Presacral neurectomy with prolongation upwards to include the origin of the inferior mesenteric artery from the aorta, and excision of the inferior mesenteric ganglion was the next to be tried. This operation is prone to cause sterility, by failure of ejaculation, a serious complication, especially as males predominate in this condition.

Spinal Analgesia as a form of treatment was first suggested by Stabins, Morton and Scott in 1935.[1] Previously this had been used as a preliminary test as to the probable efficiency of a sympathectomy. They found that the mere giving of a spinal anæsthetic would restore the normal peristaltic mechanism of the bowel. Hawksley[2] found that out of twelve cases so treated

eleven showed marked improvement. This avoided the dangers of an open operation in these children, but there still existed the dangers associated with a high spinal anæsthetic. In order to be certain that all splanchnic fibres are included, a high spinal block to the level of D_4 has to be performed.

In view of the reported favourable results following spinal analgesia, the authors decided to try the effects of splanchnic block on these patients, as this seemed to have some advantages over spinal block.

The fall of blood-pressure following splanchnic block is much less than that following a high spinal anæsthetic, and other complications which may follow splanchnic block are fewer and less serious than those which may follow spinal block.

The technique which was used in this series, Kappis method of posterior splanchnic block, may on occasions present some difficulties, especially in children, where the landmarks cannot always be identified with ease, but it is frequently less difficult to perform than the lumbar puncture necessary for the spinal anæsthetic.

In this series Anathaine or Amethocaine Hydrochloride with Adrenalin was the drug used; the strength and quantity of the solution varied with the age and weight of the patient.

Case 1. Adult male aged 46 years

Splanchnic block was performed under local analgesia. 80 cc. of 1/4000 Anathaine Solution were injected each side. There was no fall of blood-pressure following the injection and the patient's general condition remained satisfactory. He was treated with daily enemata and purgatives. On the 14th day after the splanchnic block, his bowels acted without an enema; after this his symptoms were entirely relieved and his bowels acted regularly each day. Two years later he was readmitted to hospital for a partial gastrectomy. The operation was successfully performed under Regional Analgesia; at operation his colon still showed hypertrophy and dilatation. He remained symptom-free during his stay in hospital, and also after his discharge.

When he was last seen, 3½ years after the splanchnic block had been performed, he was in good health and showed no symptoms of his megalocolon.

Case 2. Female aged 17 years

Splanchnic block was performed under local analgesia. 80 cc. of 1/4000 Anathaine Solution were injected into each side. She experienced no fall of blood-pressure or other symptoms following the block. Daily enemata were given, and on the 11th day after splanchnic block her bowels acted without an enema. She was discharged symptom-free, and has remained so for 3 years.

Case 3. Female aged 11 years

Splanchnic block was performed under light general anæsthesia. 50 cc. of 1/1000 Anathaine Solution were injected each side. Her blood-pressure dropped from 120/100 to 110/90 within half an hour of the completion of the splanchnic block, but rose rapidly after that. She showed no other symptoms, and her condition gave no cause for anxiety. After daily enemata and purgatives her bowels acted on the 12th day without an enema. She was discharged symptom-free, and has remained so for 3 years.

Case 4. Male child aged 4 years

Splanchnic block was done under a general anæsthetic. 11 cc. of 1/2000 Anathaine Solution were injected each side. He showed no fall of blood-pressure or other symptoms, and was given daily bowel wash-outs. On 11th day, as his bowels had not yet acted without an enema, the splanchnic block was repeated under a general anæsthetic. On this occasion 10 cc. of 1/1000 Anathaine Solution were injected. Recovery was uneventful; four days later his bowels acted without an enema and his abdominal distension was considerably relieved; he was discharged from hospital one week later, his constipation entirely relieved. He has remained symptom-free for 18 months.

Case 5. Male infant

Splanchnic block first performed under a general anæsthetic at age of 8 months; 1/6000 Anathaine Solution was used, but the result was unsatisfactory. He was a weak, undersized child, and was retained in hospital for many months, receiving treatment for various ailments unassociated with megalocolon. At the age of 2 years the splanchnic block was repeated under a general anæsthetic; 10 cc. of 1/2000 Anathaine Solution were injected each side. He showed no ill effects following the splanchnic block, and was given daily bowel wash-outs. The block, however, proved a failure and his constipation was not relieved, so 21 days later the block was again repeated under a general anæsthetic. 10 cc. of 1/1000 Anathaine Solution were injected each side on this occasion; and he showed no immediate ill effects following the injection. Four days later, in spite of daily bowel wash-outs, he was still constipated, and started vomiting—he also showed marked abdominal distension. After several large, hard faecal masses had been removed from his colon his condition improved, the abdominal distension became less, and he stopped vomiting. From this time his bowels acted without an enema at irregular intervals, but though his condition had improved the results of the splanchnic block did not appear satisfactory. At this stage he developed measles and was transferred to an isolation hospital. In view of the apparent failure of the block it is intended to readmit him at a future date for further treatment.

The treatment of four of the five patients in this series has proved satisfactory. These patients have now been symptom-free from 18 months to 3½ years. The failure of the splanchnic block in Case 5 was probably due in part to the difficulties in technique, in this undersized child, also probably to the fact that the correct strength and quantity of Anathaine Solution necessary to give a satisfactory result has not yet been injected in this instance.

In spite of the daily enemata and purgatives given to these patients, no result occurred until between the 11th and 14th

day after the splanchnic block, and as yet there seems to be no obvious reason for this.

The authors consider that as splanchnic block, as a method of treatment for Hirschsprung's Disease, has proved satisfactory in these patients, and as it appears to have fewer dangers and complications than most other forms of treatment used for this condition, it is worth while trying it before using more drastic forms of treatment.

Summary

The ætiology, pathology and treatment of Hirschsprung's Disease are discussed, and the splanchnic block is suggested as a method of treatment for this condition. A summary of five cases treated by this method is given and some advantages discussed.

References

[1] Stabin, L. J., Morton, J. J., Scott, W. P. M. *Amer. Journ. of Surg.*, 1935, xxvii, 107.

[2] Hawksley, M. *Brit. Journ. of Surg.*, 1944, xxxi, 245.

AMETHOCAINE OR NUPERCAINE

By E. Falkner Hill, M.D., D.A.

THERE are fashions in medicine as in other things, as all doctors will agree who have lived long enough. To give but one example: When we gave up the Clover's ether inhaler and took to "open ether" it was not long before we began to cover the gauze mask with towels, gamgee, etc., to conserve the patient's CO_2, a tacit acknowledgment that the Clover had its advantages. Just now it is the fashion to disparage spinal anæsthesia. The disparagement varies from the illogicality of attributing to spinal anæsthesia meningitis, which was admittedly due to faulty sterilization of instruments, to authoritative but vague statements about the inevitability of certain undesirable after-results. It is to be noticed that the authors of these criticisms are for the most part either men who do not use spinal anæsthesia or, if they do, use light Nupercaine. It may be that there is something peculiarly obnoxious about light Nupercaine; I don't know, I never use it. If there is, then it may account for the "inevitability of certain undesirable results."

In the comparison I am about to make between heavy Amethocaine and light Nupercaine, seeing I have no experience whatever of light Nupercaine, I must of necessity take the opinion of one who is well known and universally respected for his knowledge and experience of spinal anæsthesia. It must be admitted that, in so far as Professor Sebrechts allows emotion to interfere with the clear cold light of pure reason, emotion or prejudice, if one may use such a word in connection with so respected a name, will be all on the side of the drug he uses now, after all his experience with others, and this drug is Nupercaine and used in light solution. He condemns the use of heavy Nupercaine as causing an undue amount of headache.

Let us see what he says about Nupercaine used in light

solution. I quote from two articles which appeared in the *British Journal of Anæsthesia* in October 1934 and July 1935. Here are the most important points:

1. Percaine, a quinoline derivative, has a very strong impregnating power; it is a real " mordant ". It has the same qualities as Tutocaine as regards its action on the sensitive and orthosympathetic fibres with the advantage of an appreciably longer duration, but *the factor which characterizes it and gives it an entirely special place in the series of anæsthetic agents is the intensity and duration of the blockage of the motor fibres.*

2. This (paralysis of all the intercostal nerves) is a condition frequently seen when one uses Percaine, which, as we have said, seems to have a special affinity for the motor fibres.

3. In such cases the patient exhibits that *slight degree of cyanosis which is so characteristic of Percaine anæsthesia.* It is generally necessary to watch the patient because the diminution of the amplitude of the respiratory movements is a causal factor of circulatory hypotension.

4. In the normal human organism, as a matter of fact, every deep movement of inspiration causes a vacuum in the thorax; this vacuum does not serve solely to fill the lungs with air, but in addition causes the blood to rise into the vena cava in order to ensure the filling of the heart. The physiologists have taught us that the filling of the heart is a stimulant that is necessary to start the cardiac contractions. The suppression of the inspiratory movements of the thorax immediately causes the stoppage of the aspiration of the venous blood and the action of the heart weakens. This is how the diminution of the respiratory amplitude is a cause of hypotension.

5. The anæsthetic agent which blocks the anterior roots of a high segment of the medulla puts out of action not only the motor fibres, but also those of the vasoconstrictor orthosympathetic nerve which accellerate the heart and promote the adrenalin secretion.

Nemo omnibus horis sapit, but if we were it would matter not at all what solution we used; as, however, we are not, it is better to choose that drug which gives us the greater margin of safety.

The correct estimation of the life worthiness of a patient is one of the most difficult tasks that the physician has to face, and the nice gauging of the dose of a spinal anæsthetic which depends on that estimate is therefore a matter of great delicacy, calling for all the judgment and experience at our command. The evidence before us to-day is to the effect that a spinal anæsthetic can cause the death of a reasonably healthy patient only by paralysing respiration. That it may be a factor in causing the death of a patient who is near to it already by, for instance, bringing about a fall of blood-pressure without paralysing or even weakening respiration is probable. It will not kill a healthy patient in this or in any other way except by paralysing respiration. It is perhaps doubtful if all authorities would go so far, but what is not in doubt at all is that they all agree that the paralysis or even the weakening of respiration is a serious event in the course of a spinal anæsthesia, one which demands immediate counter-measures. It is a fair thing, then, to take as the criterion or test of a technique of spinal anæsthesia the effect of that technique, that anæsthetic on respiration. What does Professor Sebrechts say about Percaine? "The factor which characterizes it and gives it an entirely special place in the series of anæsthetic agents is the intensity and duration of the blockage of the motor fibres." Again, "This paralysis of all the intercostal nerves is a condition frequently seen when one uses Percaine." And once more, "That slight degree of cyanosis which is so characteristic of Percaine anæsthesia." Here, then, we have an anæsthetic which owes its position among anæsthetics to the intensity and duration of its action on the motor fibres, to its paralysis of all the intercostal nerves, to a state of anæsthesia characterized by "a slight degree of cyanosis." If the weakening and paralysis of respiration is the danger that we particularly wish to avoid, as it is, then in all these particulars Percaine is peculiarly unsuitable. This paralysis of all the intercostal muscles "so frequently seen when one uses Percaine" is the cause of that diminution of amplitude of respiration which Professor Sebrechts cites as the cause of hypotension.

Again Professor Sebrechts says, "The anæsthetic agent which

blocks the anterior roots of a high segment of the medulla (does he mean spinal cord?) puts out of action not only motor fibres, but also those of the vasoconstrictor orthosympathetic nerve which accelerate the heart and promote adrenalin secretion." This, then, is a very strong argument for the use of a heavy solution rather than a light one. If when using a heavy solution we find the anæsthesia higher than we intended, that is to say we have got more posterior roots involved, it by no means follows that the corresponding anterior roots are affected. Thus I have the blood-pressure record of a patient whose anæsthesia extended to the skin over the shoulder joints, yet he could breathe in comfort, could move his arms, and his blood-pressure was actually higher throughout the operation than before it started. It is quite evident that some of the upper dorsal anterior roots were still unaffected by the anæsthetic at a time when the posterior roots of several cervical nerves were deeply anæsthetized.

For the last eleven years I have been using a 1 per cent solution of what is known as Amethocaine *alias* Pontocain *alias* Decicain of a specific gravity of 1.026. Amethocaine does not last as long as Percaine, I believe, but a suitable dose should give two hours. I have often seen it last longer, but in every other respect it appears to be superior to light Percaine. That Professor Sebrechts realizes that he is dealing with a potentially dangerous injection is evidenced by the time he takes and the careful observations he makes when using it, but if such an experienced surgeon requires to take all these precautions surely those younger and less experienced anæsthetists in this country who use light Percaine should do so, too. I have never heard of such. Can it be that fools rush in where angels fear to tread?

To sum up, then, the advantages of Amethocaine:

1. It does not spend its power especially on the motor fibres.

2. Used in heavy solution any accidental excess will spend itself chiefly on posterior roots, a matter of no moment, in contrast to an excess dose of a light solution which spends itself particularly on anterior roots. Further, if the light solution be that of Nupercaine not only is the fall of blood-pressure excessive

by the paralysis of the vasoconstrictors of the anterior roots but intercostal respiration is paralysed due to the "intensity and duration of the blockage of the motor fibres". This is another cause of low blood-pressure by the diminution of the amplitude of respiration.

3. Amethocaine has a very powerful action on posterior roots as evidenced by the fact that many patients are less aware of what is going on when under Amethocaine than when under Nupercaine (heavy).

4. Amethocaine is not characterized by that slight degree of cyanosis which is so characteristic of Nupercaine.

5. The one sole advantage that Nupercaine seems to possess is that it will last longer. But should an operation under spinal anæsthesia last longer than two hours?

The 1 per cent Amethocaine solution was originally made for me by the Manchester Royal Infirmary dispensary, but of late Messrs. Duncan and Flockhart have taken it over.

SPINAL ANALGESIA, WITH SACRAL ESCAPE*

By Dr. K. E. Madan, M.D., D.A., D.O.M.S., F.I.C.A., *Lecturer, King Edward Medical College, and Chief Anæsthetist, Mayo Hospital, Lahore*

IN the ordinary type of spinal analgesia, whether induced by hypo, hyper, or isobaric solution, the result is a complete paralysis of all sensory and motor nerves from the toes right up to the segment desired. Hence in an abdominal operation, besides the abdominal area all the lumbar and sacral nerves get paralysed. It seems sometimes unnecessary that all the lumbar and sacral nerves be involved when the operation is on a part of the abdomen, and it is also undesirable, as there is often retention of urine, and so the patient is unable to pass urine and requires catheterization. Sometimes this catheterization requires to be repeated for several days as the spinal centre for micturition, situated in the sacral part of the spine, gets paralysed. This effect on the spinal micturition centre is mostly temporary, but is sometimes more pronounced by certain toxic drugs like Stovaine Anaethaine with 10 per cent glucose, heavy Nupercaine, particularly if a bigger dose than necessary is injected and if alcohol has been used to lighten the specific gravity of the spinal solution, because alcohol has a destructive action on nerve centres and tissue, as pointed out by me in the *British Medical Journal* of 6th November, 1945, under Stovaine Analgesia.

It is now a known fact that a few cases have occurred of permanent urinary and defecation derangements and the patients have sometimes sued or cursed the surgeon or anæsthetist concerned for their spinal anæsthetic. This is one of the reasons why certain operators prefer general to spinal anæsthesia, as they had such bitter experience of spinal anæsthesia. But the thing that prompted me to work out this method of sacral escape is that

*This paper was read before the Ether Anæsthesia Centenary Celebration Meeting, Bombay, October 1946.

I have seen at times male patients after operations, in the free surgical wards, in severe agony due to retention of urine, and the nurse or a lady house surgeon present there would not catheterize, and the patients waited very anxiously till a male house surgeon came up for his rounds and relieved the patient by passing a catheter. Such patients were in a condition of severe psychic shock, with beads of cold sweat on the forehead and anxious crying look, although there was no other post-operative complication. This retention of urine is therefore an undesirable and unnecessary complication of spinal analgesia.

I have, therefore, for over a year now, successfully modified the technique of administering spinal analgesia, so as to allow all the sacral nerves to escape. The patient is put in a lateral position with the thighs well flexed and touching the abdomen.

With a hyperbaric or heavy solution, even before the spinal injection is given the pelvic end of the table is raised to 15 degrees, and also the head end to 15 degrees, with a pillow under the head and neck. After thus arranging the pelvic and head ends of the table, the position of the table appears to be like a broad letter V (Plate No. I). Now, the whole table is slightly tilted to Trendelenburg position. These adjustments of the table are quickly made by the two wheels that are provided at the cephalic and the caudal ends, and also by the arrangement for tilting the whole table to Trendelenburg position. The lowest of most dependent part of the spine is now the region of the 3rd lumbar, or 3rd and 2nd lumbar. The object of keeping the thighs well flexed and raising the caudal end of the spine is to straighten up the lower end of the spine and entrap the solution in the mid-lumbar and lower-lumbar region, and prevent it entering the sacral concavity, so that all the sacral nerves and the sacral centre of micturition escape.

In *Surgical Physiology*, by J. Nash, it is stated " since micturition can be carried out naturally after ablation of hypogastric plexus, it is clear that only the sacral supply to the bladder is essential for micturition." Now the hypogastric nerves coming from the lumbar ganglia are paralysed in spinal analgesia, but

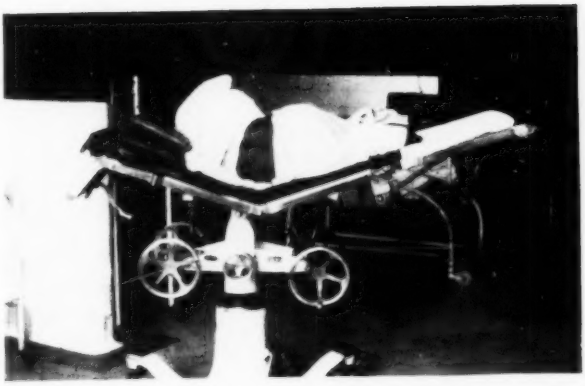

PLATE I.

For Injection of Heavy Solution.

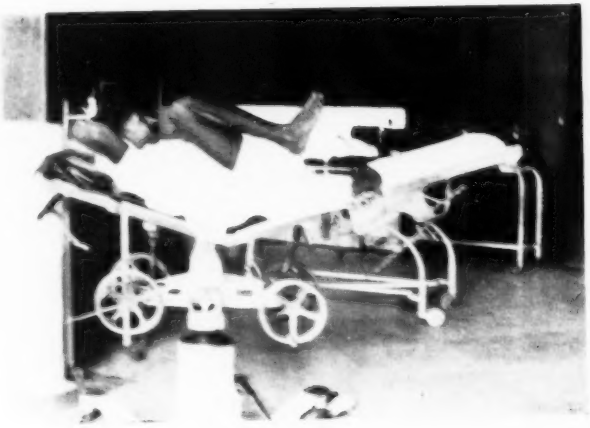

PLATE II.

After Injection.

if the sacral nerves escape, then the nervi erigentes or the pelvic nerve which arises from the sacral segments escape, and so the act of micturition can be performed normally by the patient. (Diagram No. 1.)

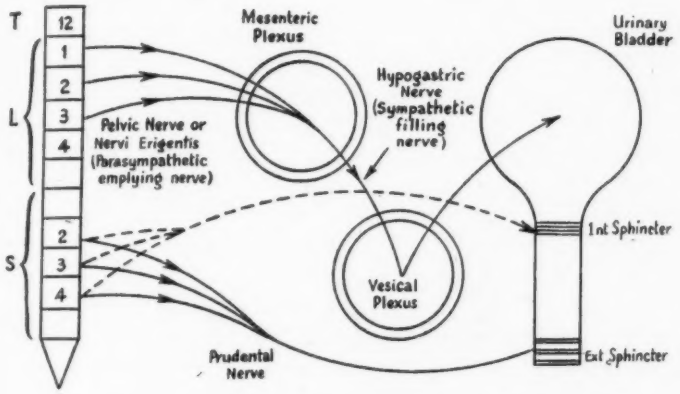

DIAGRAM Nº I AUTOMATIC CONTROL OF BLADDER

The injection is given slowly without any force or barbotage. After the injection, the patient is turned on the back with both thighs still well flexed and almost touching the abdomen for about 3 minutes (Plate No. II), after which the limbs are straightened. The quantity of solution injected is only the necessary minimum.

With a hypobaric or light solution, if the table is immediately put in the Trendelenburg position after the spinal injection, as is commonly done, the sacral nerves cannot escape, because the solution remains caudalwards, but if before the injection is given the patient is so put that the highest part of the spine and body is kept at about the 5th dorsal, and the thighs well flexed on the abdomen with patient in lateral position, and the head and neck kept low, the light spinal solution, which should be warmed, will not collect down in the sacral concavity but will ascend cephalwards.

Further procedure depends upon whether the effect of spinal

analgesia required is only for one side of the body, i.e., unilateral, or hemi-lateral, or a bilateral effect. The former, or unilateral, is advantageous for one-sided limited operations, e.g. hernias, etc., because there is less fall of blood-pressure, whereas the usual bilateral effect is good for laparotomy and operations on the middle of the abdomen. For producing a unilateral analgesia it is necessary to maintain the lateral posture, with the affected side high in cases of hypobaric or light solutions, and the non-affected side resting on the table. This position is maintained till the solution is fixed, i.e. 10 to 15 minutes, and then the patient is put on his back.

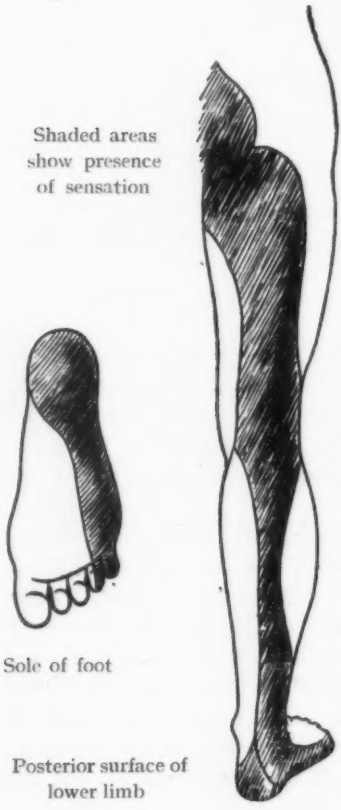

DIAGRAM No. 2.

For producing complete bilateral analgesia of the abdomen with light solutions the patient is first put prone on his face and stomach to soak the posterior roots for 3 minutes, and then is turned on his back to soak the anterior roots, but to secure the escape of sacral nerves the thighs must be kept well flexed for another 3 minutes and thereafter the lower limbs are straightened.

This method is useful in abdominal operations above the diaphragm. The head and neck are kept low with light solutions and the table is only gradually tilted to the Trendelenburg position.

Thus the escape of sacral nerves is successfully obtained

with either unilateral or bilateral type of analgesia and with heavy, light, or isobaric solutions.

The test of the success of this method of sacral escape is that the sensations over the perineum, scrotum and penis in the male, and vulva in the female, should be present, as tested by a pin, but as the genitofemoral nerve which comes from the lumbar nerves also supplies the scrotum, etc., if it is sometimes involved, the sensations may be lost, but certain areas on the posterior aspect of the lower limbs, where there is cutaneous distribution of the sacral nerves, remain sensitive, as tested by a pin. (Diagram No. 2, in which shaded area shows presence of sensation.)

In conclusion, this method has the following advantages:

1. As the sacral nerves are not paralysed, the important sacral centre of micturition, which is innervated by these nerves, escapes, and so the micturition reflex remains unaffected.

2. The post-operative period is comfortable inasmuch as there is no painful distention of the bladder, and therefore there is no need of catheterization, which may otherwise be needed, sometimes repeatedly, and which may lead to pain and infection.

3. There is less trouble for the overworked house-staff of the hospital.

4. As there is presence of sensation in the saddle area and also certain portions of the posterior aspect of the lower limbs, where also there is anatomical cutaneous distribution of the sacral nerves, the patient cannot inadvertently be burnt by a hot-water bottle over these areas.

5. For Cæsarean sections done under spinal Anæsthesia, if by this method the sacral escape is allowed to take place, then in addition to the above-mentioned advantages the tone of the uterus is better maintained, good contractions occur, and so loss of blood is diminished.

THE MANCHESTER AND DISTRICT SOCIETY OF ANÆSTHETISTS

THE desirability of forming a Manchester Society of Anæsthetists had been long obvious to some of us. The circumstances, however, had not been propitious. The credit of at last translating thought into action is due to Drs. Marson and Hunter. As the result of enquiries which they made they came to the conclusion that the opportune moment had arrived, and so sent out the following letter:

Dear Dr.,

Many of us here in the Manchester area think that the time is ripe for the formation of a local Society of Anæsthetists. You are therefore cordially invited to attend a meeting of anæsthetists to be held in the Board Room of the Manchester Royal Infirmary on Thursday, November 29th, at 5.30 p.m. Dr. E. Falkner Hill, Senior Anæsthetist to the Infirmary, has kindly consented to take the chair.

At the meeting you will be asked to consider the following:

1. The desirability of the formation of a Manchester and District Anæsthetic Society.
2. If agreed on, to proceed to elect officers and committee for such a Society.
3. To discuss the relations of such a Society to existing organizations.

If you are unable to attend we should be very glad to receive your observations, in order that they may be presented to the meeting.

Yours faithfully,

(Signed) E. A. MARSON
A. R. HUNTER.

Resulting from this circular letter a meeting was held at the Manchester Royal Infirmary on November 29th, 1945, and to our great surprise thirty-two anæsthetists attended.

Dr. E. Falkner Hill presided, and he formally put it to the meeting that an Anæsthetic Society should be formed, and this was agreed to unanimously.

A temporary committee was appointed with the object of drawing up rules and defining the functions of the Society and its relationship to the Association of Anæsthetists of Great Britain and Ireland. This committee met on several occasions, and a further meeting was held on February 21st, 1946, when the title of The Manchester and District Society of Anæsthetists was adopted and the Rules were passed and accepted.

In view of the fact that very strong support had been received from outside anæsthetists, from places as far away as Blackpool, Preston, Blackburn, Nelson, Rochdale and so on, it was felt that meetings should be arranged to combine a meal as well as the paper, so that members coming from a distance should not have the necessity of searching for a meal after coming a long journey, and accordingly the Society now meets four times a year, having a supper first at 7 o'clock and a paper read by one of the members at 8.15.

The original committee was as follows:

President: Dr. E. Falkner Hill (Royal Infirmary).

Secretary: Dr. E. A. Marson (Ancoats).

Treasurer: Dr. A. R. Hunter (Royal Infirmary).

Council: Drs. H. E. Barlow (Crumpsall Hospital), H. J. Brennan (Christie Hospital), J. C. Nicholson (Booth Hall), C. E. Sykes (Withington Hospital), R. E. Williams (St. Mary's Hospital), F. C. Simpson (Blackburn Royal).

At this meeting the newly-elected President, Dr. E. Falkner Hill, gave a very interesting address entitled "The Evolution of Anæsthesia in Manchester As I Have Seen It, 1900–1945."

Three other meetings have since been held, papers being read by Dr. J. C. Nicholson on "Anæsthesia for Penetrating Chest Wounds", two papers given on "Curare" by Dr. H. J. Simmons of Manchester and Dr. A. J. Gray of Preston, and the third one by Dr. D. Culbert of Nelson, who talked on "Trilene."

The attendance has been very good, and at the last two meetings forty-nine anæsthetists have been present on each occasion. Our circle seems likely to grow a little, as at the last meeting we had anæsthetists from as far apart as Lancaster in the north and Derby in the south.

The present membership numbers sixty-three, and all have expressed their agreement that the Society is filling a real need in the area. The attitude of the Society is that it shall be entirely non-political, and that it shall be for purely scientific and social purposes, and that anybody, whether attached to a hospital or not but whose prime interest is in anæsthetics, shall be eligible for membership.

THE MANCHESTER AND DISTRICT SOCIETY OF ANÆSTHETISTS

OFFICERS AND COUNCIL
1946–1947

President: Dr E. Falkner Hill.

Council

Dr. H. E. Barlow.
Dr. H. J. Brennan.
Dr. J. C. Nicholson.
Dr. F. C. Simpson.
Dr. C. E. Sykes.
Dr. R. E. Williams.

Honorary Secretary:
Dr. E. A. Marson,
16, Milton Crescent,
Cheadle,
Cheshire.

Honorary Treasurer:
Dr. A. R. Hunter,
28, Grange Avenue,
Cheadle Hulme,
Cheshire.

RULES

1. The Society shall be called "The Manchester and District Society of Anæsthetists."

2. Its objects shall be: (*a*) To spread the knowledge and enhance the practice of anæsthesia. (*b*) To afford a medium for the exchange of ideas. (*c*) To promote harmony and good fellowship among anæsthetists.

3. Anyone on the staff of a hospital as anæsthetist or whose prime interest is in anæsthetics may be elected a member of the Society.

4. The affairs of the Society shall be managed by a Council consisting of the President, Secretary, Treasurer and six (6) other members.

Council meetings shall be held at least twice in each year; but the Council may meet more frequently, if advisable.

A Council meeting may be summoned upon the request in writing of two members of Council with consent of the President. Seven clear days' notice to be given.

The Council shall prepare a report for the Annual General Meeting.

5. The President, Treasurer and Secretary shall be elected annually at the General Meeting, but shall be eligible for re-election, except that the President shall not hold office for more than two years in succession.

The six ordinary members of Council shall hold office for three years. Two shall retire annually and shall not be eligible for re-election until after the lapse of one year.

Note. Of those elected at the First General Meeting two shall retire at the end of the first full year commencing in April, 1946, and two each year afterwards. Any candidate may be submitted for re-election to these offices if his name, duly proposed and seconded, has been sent to the Secretary at least one month before the Annual General Meeting. Should other vacancies occur, the Council shall have power to co-opt a member of the Society to fill such vacancies until the following Annual Meeting.

At a meeting of the Council, five shall form a quorum.

6. The Treasurer shall receive subscriptions, pay all bills, and present the accounts yearly to the Council and to the Annual General Meeting. He shall be authorized to sign cheques on behalf of the Society.

The accounts shall be audited by two members of the Society appointed by the Council.

7. The Secretary shall summon all meetings, shall prepare Agenda, and shall keep Minutes of the proceedings.

A copy of these Minutes shall be sent to each member of the Council. He shall send, not less than one week before the Annual General Meeting, to each member of the Society a list of candidates for the various offices, balloting papers and Agenda papers as may be necessary.

8. The Annual General Meeting shall be held in April and at least three ordinary Meetings during the year. Some meetings may be held in towns other than Manchester.

9. Ordinary meetings shall be held for the purpose of: (1) the election of new members; (2) any other business; (3) the reading of papers and discussions thereon.

10. New members may be elected at any ordinary Meeting on the nomination of the Council. Any member of the Society may, by letter to the Secretary not less than one month before an ordinary Meeting, propose the name of a candidate, who shall be personally known to him, and he shall submit reasons in support of his proposal. The proposal shall be seconded by a Member of the Council.

The list of candidates so nominated shall be sent by the Secretary, not less than one week before an ordinary Meeting, to each member of the Society, who shall record his votes and shall return the paper to the Secretary at, or before, the Meeting. Scrutineers shall be appointed by the Meeting to count the votes and the result shall be announced to the Meeting. Two adverse votes shall reject the nomination.

The list of candidates proposed for election to the Council shall be similarly circulated for voting. The election shall be conducted by ballot and the result announced at the Annual General Meeting.

11. Visitors, by permission of the President, may be introduced by members. Their names shall be entered into a book provided for the purpose. They may take part in discussions subject to the same rules as members but they may not vote.

12. The subscription shall be £1 10s. 0d. a year payable on July 1st. (This includes 4 meals.)

The membership of anyone whose subscription is more than one year in arrears lapses.

13. Notice of any proposal to amend and alter the existing rules, or to pass new rules, must be sent to the Secretary not less than one month before the next ensuing ordinary Meeting and must appear on the Agenda of the said Meeting in the form of a written proposal. The adoption of such a proposal, in order to be effective, shall be passed by a majority of two-thirds of those present and voting.

ANÆSTHESIA AT McGILL UNIVERSITY, MONTREAL

A department of anæsthesia has recently been set up at McGill University. Its main objectives are: (1) Improvement of teaching of anæsthetics to the undergraduate; (2) Enhancement of opportunities for learning anæsthesia by the internes of hospitals connected with the University; (3) Maintaining a three-year diploma course in anæsthesia for those graduates in medicine who desire to become complete specialists; and (4) The development of investigation in anæsthesia, in the way of interrelationship in the clinic and in the laboratory and, also, in an interdependent fashion with the University's other departments.

Missing Back Numbers

OWING to the Editor's over-generosity in supplying back numbers to libraries and institutions he finds himself without a complete set for reference. He would be most grateful if any of the following can be spared, and is willing to buy any that are offered.

Vols. VI, VII, VIII, all numbers and title pages; Vol. IX, Nos. 1, 2, title and index; Vol. X, Nos. 1, 2; Vol. XI, Nos. 1, 3, 4, title and index; Vol. XII, Nos. 1, 3, 4; Vol. XIII, Nos. 2, 3; Vol. XIV, title and index; Vol. XV, No. 1.

CURARINE CHLORIDE AS AN ADJUNCT TO GENERAL ANÆSTHESIA

By E. Asquith, M.R.C.S., D.A.

Clinical Assistant in Anæsthetics, Royal Infirmary, Sheffield: Late Tutor in Anæsthetics, University of Bristol.

CRUDE curare first became known to science when it was mentioned by Hakluyt in 1594, but it was not until 1935 that Mr. Harold King, D.SC., F.R.S., of the National Institute for Medical Research, described the isolation of d-tubocuraine chloride. Messrs. Burroughs Wellcome and Co., working to King's specification, produced the first commercial supply of pure crystalline d-tubocuraine chloride and marketed it under the name of curarine chloride. It was a dry crystalline powder in a wax-sealed glass phial. The same firm now supply it in a sterile liquid form containing 10 mgm. of curarine chloride per ml. and register it under the name "Tubarine."

Prior to the introduction of Tubarine, this crystalline powder had to be sterilized and dissolved in a solvent before use. It was felt that although the powder could be autoclaved, provided all moisture was excluded, and then dissolved in sterile saline or distilled water the risk of future contamination of whatever remained of the solution was not negligible and therefore a self-sterilizing solvent would be more advantageous.

Glycero-Alcohol[1] (Glycerin 333, Aq. Dist. 146, 95 per cent Alcohol, 580 parts by volume) was chosen because it had been used as a solvent for various drugs for a number of years at the Bristol Royal Infirmary and no adverse phenomena had been noted.

The solution was made up to contain 10 mgm. of curarine chloride per ml. One particular sample was subjected to all the variations of temperature which could be expected under normal working conditions, and when assayed after being in

solution for 29 weeks it was found to have "Practically no loss in potency."[2] Culture of several samples were all sterile.

All patients in this series were premedicated with Omnopon gr. 1/3 and Scopolamine 1/150, reduction being made for the aged and frail patients. The anæsthetic agents were used as follows: Pentothal and Cyclopropane; Pentothal and Nitrous Oxide; Cyclopropane; Nitrous Oxide, Oxygen and Ether or Trilene; and Ethyl Chloride and Ether from an Oxford Vaporizer.

For all abdominal cases 10–15 mgm. of curarine chloride were given intravenously about two or three minutes before the peritoneum was opened, and if the abdominal relaxation was not perfect further 5–10 mgm. were added until the necessary abdominal relaxation was obtained. Additional doses of curarine chloride of 10–15 mgm. were added during the operation whenever further relaxation was required, and a final dose, if necessary, of 5–15 mgm. was given for the closing of the peritoneum.

Ideal conditions for intubation were produced by slowly injecting intravenously a mixture of 15 mgm. of curarine chloride and 0.5 gr. of Pentothal. With Intocostrin[3] (brand of curarine chloride supplied by E. R. Squibbs and Son of New York), Tubarine or curarine chloride[4] dissolved in sterile Aq. Dist. or saline, a precipitate forms on adding it to Pentothal; this precipitate will redissolve on shaking the mixture, although sometimes not very readily. With Glyco-Alcohol as the solvent for the curarine chloride no precipitate was noted on mixing.

Anæsthesia was maintained in Plane 1 or upper Plane 2 (Guedel) throughout the operation. During the series of cases induced with Pentothal and maintained with Nitrous Oxide and Oxygen an effort was made to ascertain the duration of action of curarine chloride. These agents were selected in preference to more powerful ones which with a slight deepening of the plane of anæsthesia cause increased muscular relaxation. With Nitrous Oxide and Oxygen at a constant percentage the plane of anæsthesia would, if anything, tend to lighten, provided, of course, that the patient's condition was not deteriorating. The

house surgeon would at regular intervals feel the tone of the rectus abdominis muscle and note was made of the time when tone returned. Average duration of activity of 1 mgm. of curarine chloride was found to be 1.2 minutes or conversely in one minute the body destroys or excretes 0.83 mgm. of curarine chloride.

It has been stated that the dose of curarine chloride should be reduced by 1/3 when Ether is the anæsthetic[5] and this was confirmed.

The power of muscle fibres to contract on direct stimulation even when curarized is well demonstrated in myomectomies. The uterine muscle will be seen to contract markedly when the myoma is being "shelled out," and due to this contraction bleeding from the cut surface of the uterine muscle has been noted to be very much less than in anæsthesias where no curarine chloride was used.

No complications were noted in this series which could be attributed to the curarine chloride. There was some increased oozing from the cut surface of the skin, but this was probably due to the fact that the blood-pressure remained constant throughout the operation, whereas it is more customary to expect some fall in blood-pressure during the long intra-abdominal operations with the deep plane of anæsthesia required. A slight increase of 5–10 mm. Hg. in the systolic pressure was noted in a few cases after the curarine chloride had been given and was attributed to the decreased tidal volume and hence an increased carbon dioxide level in the blood. This blood-pressure increase soon returned to normal after a manual compression of the breathing bag for a few minutes.

The general condition of the patients was superior to that normally seen after long anæsthesias, and post-operative nursing care was greatly reduced due to the rapid regaining of consciousness and co-operation, this in itself tending to decrease the chances of post-operative complications.

Vomiting was decreased in both incidence and severity.

The order of paralysis of muscles when increasing doses of curarine chloride are given is as follows: muscles innervated by

cranial nerves, muscles of the limbs, abdominal muscles and muscles of the thoracic cage and lastly the diaphragm. The dosage should, therefore, be carefully judged to paralyse only those muscles which if not relaxed would impair the operative field.

OPERATIONS

Upper abdominals:

Elective	32	Partial gastrectomy	16
Emergency	19	Laparotomy	7
		Gastro-enterostomy	3
		Cholecystectomy	4
		Upper ventral hernia	1
		Nephro-lithotomy	1
		Perforations: gastric, duodenal or jejunal	13
		Acute obstructions	6
			51

Lower abdominals:

Elective	33	Laparotomy	6
Emergency	30	Appendicectomy	23
		Hysterectomy	9
		Myomectomy	7
		Acute obstructions	9
		Ruptured ectopic	6
		Hemi-colectomy	3
			63

Miscellaneous:

D and C, Haemorrhoidectomy	6
Intubation: Tonsillectomy, etc.	6
*Prior to abdominals where further curarine chloride was used	28

* These have not been included in the total as they already appear in the list of abdominals.

Types of Anæsthesia:

Cyclopropane	42
Pentothal and Cyclopropane	20
Pentothal, Nitrous Oxide and Oxygen	49
Nitrous Oxide, Oxygen and Ether or Trilene	4
Ethyl Chloride and Ether (Oxford Vaporizer)	11

Respiratory complications:

Major	4
Minor	14

Age limits in years	13 to 78
Average	43
Maximum duration of any anæsthetic	3½ hours.
Maximum amount of curarine chloride given throughout any operation	50 mgm.
Average amount of curarine chloride used per operation	24.5 mgm.

Summary

A new solvent for curarine chloride is described for which the following properties are claimed:

1. Stability of curarine chloride in the solution.
2. Self-sterilizing.
3. No irritant action on veins.
4. No precipitate appears on mixing with Pentothal.

Perfect abdominal relaxation was obtained in this series of 114 unselected cases, and in the 12 extra-abdominal cases ideal conditions were created for the selected operation.

The use of ether in combination with curarine chloride is to be deprecated, as ether has already a curarizing action and an equally good operative field can be created with drugs less toxic than ether. If curarine chloride is used the dosage must be reduced by one-third.

The power of muscle fibres to contract, even when paralysed by curare, on direct stimulation is well demonstrated in shelling out myomata and has a practical value in decreasing blood loss.

Prostigmine in doses of 1–1½ mgm. intravenously was found to counteract the action of curarine chloride.

Due to the minimal disturbance of the cardio-vascular system the poor risk patient seems to have a better chance of survival.

The paralysing effect of curarine chloride on muscles, and hence its effect on the muscles of respiration, makes it a drug which should not be employed light-heartedly by those not well versed in its use.

References

1. Martindale. *Extra Pharmacopea*, 1941, Vol. I.
2. Solution assayed by Messrs. Burroughs Wellcome.
3. Shane, S. M. *Anæs. and Analg.*, 1946, xxiv, 256.
4. Gray, T. C., and Halton, J. *Proc. Roy. Soc. Med.*, 1946, xxxix, 400.
5. Griffith, H. R. *Journ. Amer. Med. Ass.*, 1945, cxxvii, 642

ABSTRACTS

In an analysis of 500 obstetrical cases with continuous caudal anæsthesia the authors recommend Pontocaine because of its low toxicity and long duration of effect. Pontocaine 0.15 per cent with Suprarenin 1:200,000 in physiological saline is the selected dose. With this solution three to five hours' relief of first-stage labour pain is obtained. Motor and sensory loss in lower limbs usually disappear within three to six hours after delivery, but of 500 cases 428 were entirely satisfactory. Thirteen of the failures were due to inability to insert the needle into the caudal canal. There was no narcotization of the baby.

For carbon dioxide absorption baralzine, composed of 20 per cent barium hydroxide with 80 per cent calcium hydroxide, is recommended.

Moisture is the essential factor to give an efficient absorbent, and baralzine has an absorbent life longer than that of "high moisture" soda lime.

REVIEWS

Physics for the Anæsthetist. R. R. Mackintosh and W. M. Mushin. Illustrated by Miss M. McLerty. pp. 235. Price 30*s*. Blackwell Scientific Publications, Oxford, 1946.

The average anæsthetist has but slight knowledge of the physics underlying the practice of his craft. He knows that ether vapour is heavier than air and he is aware of the inflammability of most of the agents with which he works. That is generally about the limit of his information in this particular direction. If he desires to be better acquainted with the physics of anæsthesia this book is admirably suited to his purpose. It is clearly written and beautifully illustrated. It deals with all the essential physical facts concerning anæsthetics and anæsthesia. Many laboratory experiments made by the author and his colleagues are described in detail, experiments dealing with temperature of anæsthetic liquids and gases under varying conditions and temperatures, and pressures in cylinders.

The question of heat loss by the patient is thoroughly examined and it is shown that in the to and fro method of CO_2 absorption suggested by Winters the heat loss by the patient in this form of anæsthesia is negligible. Investigations on ether vapour pressure under a mask and of vapour from the Oxford Vaporizer show that concentrations of ether not exceeding 17 per cent can be obtained from the mask. The maximum strength given by the Vaporizer was 25 per cent. Incidentally the author states that in flying, after 30,000 feet upwards, despite the fact that the airman breathes undiluted oxygen, the difference in pressure between alveolar and venous oxygen falls. At 42,000 feet the partial pressure of oxygen to the alveoli is just enough to ensure adequate oxygenation. Above this height the partial pressure of oxygen in the alveoli is not enough to oxygenate the venous

blood and support consciousness and life. Observations on the pressure produced in syringes show how high a pressure can be obtained without undue effort by using a syringe with a small diameter, a fact of practical importance in the practice of local anæsthesia. The questions of dissolved gases, cyanosis and respiratory obstruction are among the other phenomena described and discussed. We recommend the book as a stimulating one for the practising anæsthetist to study.

Text book of Gynæcology. F. H. PEEL, F.R.C.S., F.R.C.O.G., *Obstetrical and Gynæcological Surgeon, King's College Hospital, etc.* 2nd edition. pp. 467, 217 illustrations. Price 21*s.* Wm. Heinemann, London, 1946.

The chief new features of this edition are in the chapters on physiology, uterine disorders and sterility. There are new illustrations and an appendix of hormone preparations. The book remains a first-rate guide to practitioner and student in the principles and practice of gynæcology.

An Omission.

In our January 1946 issue we published an article by D. M. E. Crouch, M.B., and Edith S. M. Merry, M.B. Both of these ladies should have had D.A., after their names, the omission of which we regret.